Authors' Abstracts.

PAPERS READ AT THE MONTREAL MEETING OF THE GEOLOGICAL SOCIETY OF AMERICA.

Sands and Clays of the Ottawa Basin. By R. W. Ells.

The paper describes the leading physical features of the Ottawa River basin, which comprises about 130,000 square miles, and which includes numerous large streams, both from the north and south. The elevations of the height of land on the north, which divides the Ottawa waters from those which flow into James Bay, are given as ranging from 900 feet at Grand Lake, one of the large expansions in the upper part of the Ottawa River, to about 1100 feet near the source of the stream. Further east at the head of the St. Maurice, the elevation is somewhat greater, probably between 1300 and 1400 feet. The height of the divide to the north of Lake Temiscaming is given as 923 feet, while the elevation of Lake Temagami, which empties from the south into Lake Huron and from the northeast into the Ottawa, is 967 feet above sea. The height of land along the southern rim of the basin ranges from 645 feet at Lake Nipissing to about 1400 feet at the head waters of the Petewawa and Madawaska rivers, decreasing to 417 feet at the head of the Rideau.

Over all this area to the height of land, apparently continuous deposits of a blue clay, similar in character to the recognized marine clays of the lower Ottawa and St. Lawrence basins, can be seen. These have in places a thickness of over 100 feet, and they are overlaid over a great portion of the basin by sands, similar in character to the well-known Saxicava sands which contain marine fossils further east. In the eastern part of this area well defined deposits of these clays and sands holding marine shells, are found at elevations of nearly or quite 600 feet above sea level, while shore lines and old beaches, also of marine origin, are to be seen along the north side of the St. Lawrence, as well as along the lower Ottawa, which range in elevation from 600 to at least 1000 feet above present sea level. The bones of a whale

have been obtained from a large kame-like ridge near Smith's Falls at a height above sea of 440 feet, the skeleton being reached in the excavation at a point 50 feet from the outer zone of the ridge. This elevation is nearly 200 feet above the present level of Lake Ontario. The indications of submergence, as seen along the sides of the Montreal mountain, are clear at elevations from 220 to 750 feet or nearly to the summit. Similar high level beaches are found along the slopes of the mountain ranges in eastern Quebec to a height of nearly, or in places quite 1000 feet, so that it may be considered as fairly well established by the latest evidence that this portion of Canada was submerged, subsequent to the glacial period, to a depth of at least 1000 to 1200 feet. All the high level beaches in the St. Lawrence and Ottawa valleys front directly to the open estuary of the St. Lawrence River, and there were, in so far as can now be seen, no barriers to interrupt the inland spread of the sea between that river and the upper great lakes. The submergence mentioned would carry these waters over the height of land in nearly every part of the Ottawa basin and support the view now put forward that the clays which are found on most of the portages at the highest levels are marine. It is probable also on this theory that the Erie clays, which are very similar in character to those of the lower Ottawa, and unconformable to the overlying series, are the true equivalents of the Leda clays of the eastern area, though this point requires further detailed examination before the exact relations of the fresh water deposits of this part of Canada to the underlying clays can be completely established.

Note on an Area of Compressed Structure in Western Indiana. By GEO. H. ASHLEY.

As is well-known, the rocks of Illinois, most of Indiana, and part of Kentucky form a basin with gently dipping slopes, and where local evidences of stress are observed they usually indicate tension. Thus the faults are commonly tension or normal faults, and the joints are perpendicular and open. Recently several local areas of disturbance have been observed and this note is intended to call attention to one of these. In this case the evidence of considerable tangential pressure is seen in (1) overthrust or pressure faults, (2) coal beds compressed laterally until they become several times their original thickness; (3) in place of perpendicular open joints, confined to the coal

and with faces even but not polished or showing any indication of rubbing, such as are common in the region as a whole, are found regular oblique joints, cutting the roof and floor as well as the coal, and having their faces much slickened. These joints are evidently shearing planes, and show signs of incipient movement, or in some cases, as in one of the figures given, they become fault planes allowing the lower of two coal beds twenty feet apart to slide an unknown distance up over the upper bed. The main system of joints dip to the north, a second set sometimes developed dip to the south. The pressure acted with the general strike of the rocks. The area described covers a few square miles southwest of Asherville, Clay county, Ind. The structure has been disclosed by the operations of mining.

Syenite-porphyry Dikes in the Adirondacks. By H. P. CUSHING.

Interesting dikes of pre-Potsdam age have been recently found in the Adirondacks which constitute the complementary rocks to the diabases of the region. Basal conglomerates of the Potsdam contain pebbles derived from them. On the other hand, together with the diabases, they comprise the only unmetamorphosed pre-Potsdam rocks known in the district.

These dike rocks are made up of feldspar, quartz, and biotite, with or without hornblende, and with accessory iron ores, apatite, augite, titanite. Both orthoclase and albite feldspar are present, commonly intergrown as microperthite. The rock is porphyritic, both feldspar and biotite occurring in two generations, the latter only sparingly. The feldspar largely predominates over all other minerals, constituting from 60 to 80 per cent. of the rock. The ground mass structure is trachytic or orthophyric.

Chemically the rocks are characterized by high alkali and low lime-magnesia percentage, and rather low ratio of alumina to silica. They belong to the alkali-syenite group of Rosenbusch. Their bunched distribution and mineralogic similarity indicate that they were products of a common magma, and if that be so they afford an interesting case of magmatic differentiation as they range from 69 to 52 per cent. of silica. With decreasing silica the lime, magnesia and alkali percentages rise, the latter retain their preponderance.

The greater number of the dike rocks would be classed as syenite-porphyries, nordmarkite, and pulaskite types. The more acidic repre-

sentatives belong properly with the alkali-granites. The most basic rocks represent an undescribed type, so far as the writer is aware, being very basic mica-syenite-porphyries.

Together with the diabases these rocks form an eruptive assemblage quite similar to that which characterizes Keweenawan time in the upper lake region, nor, since there is in each case the same relationship to a younger unconformable sandstone of upper Cambrian age, and to an older mass of gabbroic intrusives, can they depart widely from them in age.

Leaving out of the question the older gneisses of somewhat doubtful origin, there were three distinct periods of igneous activity in the Adirondack region. The earliest gave rise to gabbros and granites, the next to diabases and syenite-porphyries, the last to bostonites and various basic rocks (camptonites, monchiquites, etc.). Analyses show an astonishing agreement between the acidic rocks of each period on the one hand and the basic rocks on the other. Though a long time interval elapsed between each, magmatic relationship seems not unlikely.

Accumulating evidence seems to the writer to indicate the possibility that three similar periods were characteristic of the entire shore line of the Canadian and Appalachian protaxes, and that such possibility should be added to the working hypotheses of all workers in that field.

(Other Abstracts, Reviews, and Publications deferred to next number.)